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those at the base of the culm crowded and equitant; ligule a ring of short hairs; leaves smooth and glabrous, glaucous, 4′–15′ long, 2″–4″ wide, abruptly acute, the uppermost culm leaf short, and usually remote from the infloresence, or often wanting; spikes 4–6, 3′–5′ long, erect or slightly spreading; spikelets divergent to the triangular rachis, which is scabrous on the angles; empty scales of the spikelet 1-nerved, scabrous on the keel, the first ovate, acute, about two-thirds as long as the second; second 2-toothed, the teeth obtuse and erose at the apex, oblong, 1½″–2″ long, including the scabrous awn which is ½″ long; third scale about 1½″ long including the awn which is ½″ in length, brown, ovate, 3-nerved, the nerves pubescent with long ascending hairs; fourth scale empty, 1″ long, elliptic in outline, cucullate, remote from the third, bearing an awn about ½″ long just below the apex; seed ¾″ long, narrowly oval in outline, triangular, translucent, yellowish streaked with purple.

Resembles *C. Floridana* Vasey; that species differs in having only 1 or 2 spikes; larger spikelets having 5 scales and 2 flowers, the upper one staminate; second empty scale broad and rounded at the erose apex; the hairs on the nerves of the third scale shorter; the fourth scale obovate and obliquely truncate at the apex.

Collected by the writer near Orange Bend, Lake Co., Florida, during the past summer, in low pine lands, no. 2149. It was also secured by A. H. Curtiss at Jacksonville in 1875; his number 3445 is the same. Fredholm obtained it along the banks of the St. John's River in Duval Co., Florida, in 1893, no. 319.

Notes on some Cyanophyceae of New England.

By William Albert Setchell.

The Cyanophyceae or Blue-Green Algae of the United States are little represented in collections and exsiccatae, and their occurrence and distribution is in great need of more careful study. For many years there has been a lack of good monographs relating to the group, and the redescribing under many different names of the same form made the matter of the identification both of genera and of species so difficult that there has been little temptation to the ordinary student to pay any attention at all to any of the forms.

Recently, however, there have been published two monographs, the results of the patient working over of abundant materials by men of such experience and insight that the filamentous species of the Cyanophyceae are now arranged and defined in a most satisfactory fashion.

The heterocysted forms, multiplying by means of hormogonia, are given in the "Revision des Nostocacées Heterocystées" by Bornet and Flahault (Ann. Sci. Nat. (VII.) **3**: 323–381, 1886; **4**: 343–373, 1886; **5**: 51–129, 1887; **7**: 177–262, 1888), and the homocysted forms with the same kind of reproduction are given in the "Monographie des Oscillariées" by Gomont (Ibid. VII. **15**: 263–368, *pl. 6–14*, 1892; **16**: 91–264, *pl. 1–8*, 1892.)

In both of these works a considerable number of species are credited to America, chiefly from specimens collected by Farlow, Collins, Holden, Wolle and the writer, but many more are to be expected and the writer hopes to be able to supply at some future time a full list of all found within our boundaries.

The marine forms have been much more studied than those of the fresh waters, and have been mentioned in the papers of Farlow and Collins. The account of the species of the fresh waters found in Wolle (Fresh Water Algae of the United States, Bethleham, 1887) is, however, so confused and inexact as to allow no dependence to be placed upon it. Consequently we must, for the present, accept as a summary of the knowledge of our species the information contained in the two monographs mentioned above and proceed to work out from them and with their aid.

The following species, occurring for the most part in New England, seem to deserve mention.

Calothrix Juliana (Menegh.) B. & F., known only in this country from Mill Brook, Shelburne, N. H., where it was collected by Prof. W. G. Farlow, has occurred to the writer in Massopoag Brook, Sharon, Mass., and in Trading Cove Brook, Norwich, Conn. It grew upon stones in small tufts consisting of a few erect parallel filaments and could easily be distinguished by the touch, even on stones thickly covered with diatoms and other forms. It is easily distinguished from any other of our species by the absence of heterocysts. It grows upon wood as well as stones in the Quinebaug River, in Lisbon, Conn.

C. Braunii B. & F., credited by Bornet and Flahault to Germany and Denmark, was first found in this country by the writer, growing upon stones in a small brook at Sharon, Mass. Later it was found near Bridgeport, Conn., by Mr. Isaac Holden, growing upon wood and stones. It also forms extended patches on rounded stones in a small rivulet at Cataumet, Mass. It is of rapid growth, forming patches which are at first small and orbicular, but later enlarging and confluent into broad expansions of indefinite extent and shape, and often becoming decidedly verrucose on the surface. In color the patches vary from dark green to nearly black. The filaments are short and parallel and the structure of the patch resembles that of *Isactis plana*, but, of course, lacks the common enclosing matrix of that form.

RIVULARIA BORNETIANA n. sp. This curious species was found growing on the stems and leaves of *Ruppia maritima*, forming solid spherical thalli varying from somewhat less than a millimeter to something over a centimeter in diameter, according to age. Frequently a row of closely-placed spheres coalesce into a cylindrical mass 5–8 centimeters long. The thalli are of fairly firm consistency and vary in color from a deep bluish-black when young to a light olive green or pale yellow when old. They are not at all incrusted with lime. The filaments radiate in a regular fashion from the center, becoming, however, decidedly flexuous in the older thalli. They vary in diameter from 8–20 μ, and separate readily from one another on crushing. The sheath is wide and conconspicuous, colorless to deep brown in color, and very much lamellose and ocreate above. It varies in width below from 2–4 μ, sometimes becoming as wide as 20 μ. The trichome is usually about 4 μ in diameter, but occasionally reaches 16 μ. It is usually very much torulose when young, but very little so when older. The cells are from one-half to five times as long as broad. The cell limits are distinct in younger but very obscure in the older specimens, and the cell contents are light blue and provided with a few scattered granules. The heterocysts are basal, from depressed globular to ellipsoidal in shape, and from 6–8 μ in diameter. The terminal hairs are long and slender in the younger plants, but are almost wanting in the older ones.

For several years this species has been found in abundance in shallow water ahout the edges of Watch Hill Pond, in southwestern Rhode Island. The pond is separated from the open Atlantic Ocean by only a narrow line of sand dunes, through and over which the autumnal and winter storms often dash the surf. Consequently the water of the pond has a distinctly saltish taste. The *Rivularia* is associated with *Anabaena variabilis*, *Phormidium Valderianum*, *Microcoleus chthonoplastes*, *Chara aspera*, *Chara crinita* and various species of *Closterium*, *Scenedesmus*, etc.

This species approaches *R. Biasolettiana* in structure, but differs from it decidedly in habit, and it was thought at first it might perhaps be an epiphytic form of that species. But the globular shape of the thalli is exceedingly constant, and although carefully sought for, typical *R. Biasolettiana* was not found anywhere in the same vicinity. It seems best therefore to regard it as a distinct species, and the writer takes great pleasure in dedicating it to Dr. Edouard Bornet, of Paris, who has done so much toward furthering our knowledge of this group of plants.

R. Biasolettiana Menegh. occurs in fairly typical form in perfectly fresh water at Gardner's Lake, in eastern Connecticut. It forms small flattened thalli on stones along the shores of the lake.

Capsosira Brebissonii Kuetz., occurring in Sweden, France and Germany, grows also in this country upon a large rock on the eastern side of Round Pond at Lantern Hill, near Mystic, Conn- It forms small hemispherical black thalli from 1–2 mm. in diameter. They are crushed with some difficulty, but then show the *Stigonema*-like filaments with lateral heterocysts very plainly. It occurs sparingly also upon submerged dead wood.

Nostochopsis lobatus Wood, found near Philadelphia by Wood and in Vermont by Faxon, has occurred to the writer in some abundance at Mt. Carmel, about seven miles north of New Haven. The thalli grew upon stones in more or less rapid water in a brook just west of the " head" of the mountain.

Microchaete tenera Thuret, not hitherto credited to this country, grows in various localities in Connecticut. Specimens collected near Norwich and examined by Dr. Bornet, have cylindrical spores in a series, exactly corresponding to those described for *M. diplosiphon* Gomont. This species much mixed with various gelatinous algae occurs upon dripping rocks near Norwich and New Haven, Conn.

Scytonema crispum (Ag.) B. & F. This species, known as *Scytonema cincinnatum* or *Lyngbya cincinnata*, although not credited to North America by Bornet and Flahault, is probably not uncommon in the Eastern United States. Wolle had it from Pennsylvania or New Jersey, as is evidenced by a specimen in the writer's possession. Mr. Isaac Holden has found it near Lanesville, Conn.; Mr. W. J. V. Osterhout finds it in abundance near Providence, R. I.; Mr. Wesley R. Coe, in Florida; Dr. J. E. Humphrey, in Jamaica, W. I., and the writer about New Haven, Conn. The filaments vary very much. Sometimes both branches and heterocysts are rare and the species looks very much like a *Lyngbya*, very often the scanty branches occur single and adjacent to a heterocyst and it resembles greatly a *Tolypothrix*, while the geminate branches midway between two heterocysts, characteristic of *Scytonema* are generally found only after long and careful search.

Scytonema Javanicum (Kuetz) Bornet, one of the species with erect branches agglutinated into *Symploca*-like fascicles and previously credited chiefly to the tropics (Java, Brazil and Guyana), but also found in France, according to Bornet and Flahault, reappears in this country in small quantity, growing on the trunks of trees in Middlesex Fells, Melrose, Mass.

Hassallia byssoidea Hassall is a very variable species and is credited to South Carolina only in this country by Bornet and Flahault. A form of it, not exactly typical, grows on rocks at the water's edge along the Quinebaug River in Lisbon, Conn. It forms small tufts nearly black in color. It is characterized, as a form, by its regular, erect branches given off at an acute angle.

Desmonema Wrangelii (Ag.) B. & F. is a curious genus of the Tribe Scytonemaceae, characterized by having several filaments inclosed in a common sheath and also by having basal heterocysts. It is very abundant in Roaring Brook, a mountain rivulet in Cheshire, near New Haven, Conn. It grows upon stones and rocks in the swiftest currents and forms slippery, bluish black expansions. On being detached from the substratum it falls apart into small penicillate tufts. It is present during the month of June at least.

Nostoc parmelioides Kuetz. is one of the most readily recognized species of the genus. The frond is erect and attached at one point. It is generally strongly flattened and orbicular, with edges more or less strongly crenate. Within, the central filaments radiate from the attached portion, but the cortical filaments are convolute and twisted. It is the *N. cristatum* of Bailey and the *N. alpinum* of Wood and Wolle. Bailey found it in New York, and Wood and Wolle in Pennsylvania. The writer has it from near Harrisburg, Penn., collected by Harry M. Kelley, and has found it in abundance in brooks at Mt. Carmel, Conn.

Anabaena variabilis Kuetz., which may be distinguished from any other species of the genus occurring in this country by its oval, seriate spores remote from the heterocysts, occurred to the writer in the autumn of 1894 in the brackish pond near Watch Hill, R. I., mentioned above. There was a great abundance of it, forming a dark greenish-brown, gelatinous layer on the floating leaves of *Ruppia*. The species is new to North America.

Schizothrix lardacea (Ces.) Gomont. Of the twenty-seven species of this homocysted genus given by Gomont in his monograph, only four are credited to North America north of Mexico. *S. lardacea* was found in some abundance on dripping vertical faces of trap at East Rock, New Haven, Conn. It formed masses of a dirty brown color. It has previously been found only in Germany, France and Italy.

Sch. fragilis (Kuetz.) Gomont was found at Brookfield, Conn., forming reddish crusts on stones kept moist by the spray from a waterfall. The red color was due to a unicellular organism associated with it. Hitherto it has been credited only to Switzerland.

Hydrocoleum homoeotrichum Kuetz. The species of the genus *Hydrocoleum* are distinguished by their caespitose habit and calyptrate terminal cell. No one of the four fresh water species is credited to North America. *H. homoeotrichum*, however, was found by the writer growing in small short tufts on the posterior ends of shells of living fresh water mussels (*Anodonta*) in Trading Cove Brook, Norwich, Conn.

Symploca muralis Kuetz., collected in New England by Farlow grows also on moist soil about the public pump in East Falmouth, Mass., and what appears to be the same species occurs abundantly on flower pots in greenhouses in New Haven, Conn.

Lyngbya versicolor (Wartm.) Gomont, not credited to North

America in the "Monograph," has been found by Dr. Humphrey in Jamaica, W. I. (cf. Phyc. Bor. Am., No. 54), and by the writer at Salisbury, Conn., and in two localities near New Haven, Conn. (cf. ibid., No. 54). It grows attached at first, but later floats free.

L. Lagerheimii (Moeb.) Gomont. A very slender species distinguished by being fairly regularly twisted into a loose spiral, previously found only in Brazil, has reappeared in Southern New England. The species grows in brackish water in a small pool near Norwich, Conn., and in Little Pond, Falmouth, Mass. In each case it was growing upon *Cladophora expansa* and in one case was associated with *Scenedesmus caudatus* and various desmids, while in the other it grew with *Chara crinita* and *Gloeotrichia Pisum*. It also grows somewhere near New Haven, as considerable quantities of it appeared in an aquarium in the Biological Laboratory of the Sheffield Scientific School.

Phormidium Valderianum (Delp.) Gomont. This is another interesting species found in Watch Hill Pond, R. I. It grows in fresh water in Europe and forms expanded, lamellose strata on rocks and plants. In this locality, it forms a verdigris-green gelatinous cylindrical covering to the elongated stems of *Ruppia maritima*. It is common to find along the shore of the pond *Ruppia* stems partially dried and then the *Phormidium* layer is papery in texture.

Arthrospira Jenneri Stiz. is not credited to this country by Gomont. It is a large form and unmistakable. It has been found by Mr. Isaac Holden in some abundance near Schenectady, N. Y.

ARTHROSPIRA GOMONTIANA n. sp. For several years Mr. Isaac Holden and the writer have found in the vicinity of Bridgeport, Conn., scanty material of an *Arthrospira* which appeared to be different from any previously described. In June, 1895, however, a considerable quantity was found and sufficient material was preserved for future distribution and study.

This species makes its home in a pool of fresh water near Factory Pond in the northern part of Bridgeport, and floats upon the surface in verdigris-green patches of comparatively small size, resembling very much the so-called "Wasser blüte" of *Anabaena flos-aquae*, *Gloiotrichia Pisum*, etc. The floating masses are made up of small flocculent bits, each of which contains a considerable number of the trichomes of the *Arthrospira* held together by a common jelly.

The diameter of the trichome is from 2.5–3 μ. It is regularly twisted into a rather lax spiral, the distance between the turns being 16–18 μ, and the width of the turn about 6 μ. Caduceus forms are not uncommon. The cells of the trichome vary from 4–5 μ in length; the cell divisions in vigorous trichomes are indistinct with few granules and with the cell contents light bluish green by transmitted light. In the majority of the cells large vacuoles are present.

This form is decidedly smaller than either *A. Jenneri* or *A. Platensis* and with a laxer spiral. From *A. miniata* it differs both in habitat and habit, and in the fact that the extremities are not at all capitate. As the species appears to be new, the writer desires to dedicate it to M. Maurice Gomont, of Paris, as a token of his esteem and respect.

The writer wishes also to express his deep obligation to Dr. Bornet and M. Gomont for assistance in determining the above-mentioned forms, as well as others, without which no certainty would have been possible.

Personal Nomenclature in the Myxomycetes.

By O. F. Cook.

As has been said, there are two ways of naming plants, according to the system of priority, or according to the personal system, which is no system at all. The alleged object of both methods is to secure uniformity of nomenclature, and opinion upon their relative merits depends on whether uniformity with the past is looked upon as more important than uniformity with the future. That the personal system does not always secure uniformity even with the immediate past is evidenced by two recent books, both purporting to be monographs of the same group of organisms. They are based, practically, on the same collections and are published only two years apart. Massee's "*Monograph of the Myxogastres*" recognizes 41 genera. Lister's "*Mycetozoa*" describes 38, but 13 of these are different from those of Massee. Massee has 430 species, of which nearly one-third are not recognized as valid by Lister, while another third have their names changed, so that of